

Dr. Foster will be successful in attracting other advanced mathematicians to the study of his subject; and better still, that he will be able to persuade those who are in the beginning of their undergraduate mathematical education to devote some of their spare time—quite a recreation as it would be—to learning the first principles and the methods of physiological research, under his able supervision.

Truly Dr. Foster and Dr. Clerk-Maxwell have a noble work before them, and we may hope that by their example and precept Cambridge may after a lapse of thirty or forty years, in the matter of physical and physiological research, be on a level with a second-rate German University.

ATHENIAN TEXT-BOOKS OF SCIENCE

Εγχειρίδιον της Χημείας, κατά τας νεωτάτας της επιστήμης προσδοῦς. (Υπο Αναστ. Κ. Χρηστομανου. Εν Αθηναις. 1871.)

Επιστημονικα Παραδοξα. (Υπο Δ. Σ. Στρομπους. . . . Αθηνησι, 1864.)

Περὶ Αέρος και των Ενεργειων Αυτου. (Υπο Δ. Σ. Στρομπους, 1869.)

Περὶ των Γνωσεων και των Δοξασιων των τε αρχαιων και των νεωτερων ὡς προς τα φυσικα φαινόμενα εν γενει, και των μεθοδων των ερευναν αυτα. (Υπο Δ. Σ. Στρομπους, 1858.)

THE University of Athens has existed for no more than thirty-seven years. Two of its four Faculties, —the Faculty of Medicine and the Faculty of Philosophy, require a knowledge of natural philosophy and chemistry. It is difficult to understand how these subjects could have been taught at first, for the students by no means often understand French, and no Greek books on science then existed. No doubt the professors taught as Plato and Aristotle taught; and the note-book of the student had to be his text-book. But matters have changed since then: the demand for text-books in Greek has caused them to appear; slowly indeed, for we have seen but few books on science, but we may hope that the original text-books which are now beginning to appear are the first of a continuous series. Do not let it be imagined that the works whose titles are given above are the only works on science we could find in all Athens. There is a big book on Physics by M. Damaskenos, who has also written on trigonometry and meteorology; there are various memoirs by M. Stroumpous on the refraction of light; on the internal constitution of flame; on the fundamental principles of hydrostatics, &c. The University is tolerably well supplied with physical and chemical apparatus, and in good time, we hope, some good student-work will be done there.

Many of the professors have studied in Paris, and we see evidence in the text-books of French science and of French thought. Prof. Chrestomanos appears, however, in the compilation of his Chemistry, to have consulted most of the recent books and memoirs. We are glad to see Canizzaro often quoted as an authority. The work does not present any specially noteworthy features, but it is sound and eminently clear. The phraseology is at times somewhat strange to a western student; thus we do not em-

ploy such words as "Physiography" and "Phutology." . . . After some prefatory remarks concerning the division of the sciences, we have a few pages given to the history of chemistry. The period of Alchemy is wrongly stated to extend from 400 to 1500 A.D. Then Iatrochemistry from 1500 to 1650; Phlogistic chemistry from 1650 to 1783; the new chemistry of Lavoisier and Davy, and so on to the chemistry of Kekulé and Canizzaro. This is followed by a short account of physical chemistry; then an account of crystallography with good figures of crystals. Although many of the names of our elements are derived from the Greek, the table of elements looks rather puzzling: lead is of course μόλυβδος, while molybdenum becomes μολυβδαίνιον; platinum is λευκοχρυσος; tungsten (or Wolfram) is βολφραμιον; nitrogen is at the beginning of the alphabetical list; copper near the end. Again, as to compounds the names of the oxides of nitrogen read as ὑποξείδιον Ἀζώτου; ὀξείδιον Ἀζώτου; νιτρῶδες ὀξύ; ὑπονιτρικὸν ὀξύ; νιτρικὸν ὀξύ. The theory of atomicities is well developed: niobium and tantalum are the only pentatomic elements; while molybdenum and tungsten are the only hexads. The peculiar atomicities of nitrogen and iron are not noticed. The building up of compounds on the type respectively of one, two, and three molecules of water is fully discussed (μόριον is the term used in place of our low-Latin *molecula*). Full tables of grouped elements appear; and the naming of compounds is considered. After this considerable and important introduction the work begins with hydrogen in the usual manner, and the account of the other element follows in due course.

The "Scientific Paradoxes" of Prof. Stroumpous is a volume of essays on physics and physiology; including magnetism, electricity, illusions, alchemy. Here too we find paradoxes of another kind; would Mr. Glaisher recognise his name as ὁ Γλαισχερός, or Mr. Coxwell as ὁ Κοξουέλλος? The treatise on the Air, by the same author, is a tolerably complete treatise on pneumatics, illustrated by very crude, but original and sufficient woodcuts. The discourse on the history of Science is very interesting, and full of excerpts from Plato, Aristotle, and other ancient writers. For them we think Prof. Stroumpous has claimed too much; we cannot with any degree of certainty assert that Aristotle discovered that the air possesses weight. His experiment at the outset is altogether faulty, for he tells us that an inflated skin (ὁ πεφυσνημένος ἀσκός) weighs more when filled with air than when empty, that is, not inflated. This of course we know from the law of Archimedes is false; a bladder full of air weighed in air can weigh no more than the uninflated bladder.

These works constitute the commencement of Athenian science. The city, while its art, and literature, and philosophy, have unhappily long passed their culminating point, is more scientific than it has ever been before. Not far from the place in which the Peripatetic made his experiment with a crude statera and an empty wine skin with Theophrastus as demonstrator, Stroumpous now weighs his really vacuous vessel, and Chrestomanos explodes oxygen and hydrogen. Thirty years of science in a remote city, out of the highways of European intelligence, cannot effect much; but we hope in the course of the century original workers will multiply in Athens, and as much will be done to promote chemistry and physics,

as has been done by Dr. Schmidt in the service of astronomy on the Hill of the Nymphs, over against the Acropolis.

G. F. RODWELL

THE ACRIDIDÆ OF NORTH AMERICA

Synopsis of the Acrididæ of North America. By Cyrus Thomas, Ph.D. Published in Vol. v. of Report of the United States Geological Survey of the Territories. Pp. 1-262. (Washington, 1873.)

IN a prefatory note to this volume the United States Geologist, F. V. Hayden, tells us that Prof. Thomas's work on the Acrididæ of North America is published "in the belief that it is a substantial contribution to natural history;" and certainly it is impossible, on a perusal of the work, not to share in this belief; it is, moreover, another proof of the great boon conferred upon natural science by public surveys and Government expeditions. Serious and extended works on natural history (except, perhaps, those relating to some few very popular branches of it) would seldom be produced, or in many cases their materials be collected, if it were not for the assistance of natural history societies, public surveys, and expeditions; organisations of these kinds can afford to disregard the commercial aspect of the question, and are able to bestow upon the public, works which private enterprise would seldom venture upon. Among insects, the Orthoptera (of which order the Acrididæ are a well-defined family group) are certainly not the most popular among entomologists, though, for many reasons, of great interest to others. Few persons but have some cherished association with, for instance, the persistent chirp of the cricket on the hearth, or the shrill stridulations of some of the grasshoppers; there are, again, few more wonderful sights in the insect world than a flight of locusts; and few natural scourges are more terrible than those inflicted by the devastations of these rapacious creatures; the walking-leaf and stick insects (Mantidæ and Phasmidæ) are also very popular objects for sightseers in natural history museums. The lack of general popularity among collectors and students arises probably in great measure from the Orthoptera being commonly less sightly as cabinet objects than some other orders of the Insecta, though perhaps it arises as much or more from the paucity of works combining both a general and special treatment of the whole, or of well-defined groups, of the order under consideration. Dr. Thomas's work is undoubtedly calculated to encourage the study of the large group included under the *Acrididæ*, and to be peculiarly acceptable to American entomologists, for it not only describes a large number of North American species (both known species as well as new ones), but it gives, in an "Introduction," pp. 9-45, a concise view of the general classification of the Orthoptera, with the relation of the Acrididæ to the other sub-ordinal groups, their structure, internal and external, and the distribution of genera and species over North America. This introductory part of the work is illustrated by two remarkably clear and good woodcuts, showing all the different portions of external structure, with the name of each part.

The remarks of Prof. Thomas, in the chapter on Classification, bring strongly before us the difficulties and

imperfections involved in a linear arrangement of any portion of the animal kingdom; but if a real genealogical relationship be that which exists between all living creatures, then it is apparent at once how comparatively unimportant is (generally speaking) the mere linear arrangement of the series; it is, indeed, the only possible one on paper, but in reality some of the most important relationships do not run in one unbroken line, but in lines diverging at many different angles, and in many different planes. Dr. Thomas considers the Orthoptera as arising from the *Crustacea*, and, after reviewing the various extant arrangements of their families, divides that under consideration—ACRIDIDÆ (*i.e.* the saltatorial Orthoptera, or Grasshoppers with comparatively short antennæ), into two *sub-families*—ACRIDINÆ and TETTIGINÆ; the former of these is sub-divided into three divisions:—CONOCEPHALIDES, ORTHOCERIDES, and XIPHOCERIDES, forming (in the order in which these are here given) seven groups:—1. PROSCOPINI; 2. TRYXALINI; 3. TRIGONOPTERYGINI; 4. CEDIPODINI; 5. ACRIDINI; 6. XIPHOCERINI; 7. PHYMATINI (?). The three first of these groups belong to the *Conocephalides*, the two next to the *Orthocerides*, and the two last to the *Xiphocerides*.

The sub-family TETTIGINÆ is undivided, and consists of a single group, TETTIGINI.

A useful and concise Synoptical Table gives the leading characters of the author's sub-families and subordinate groups; and another Synoptical Table of the United States genera (p. 49), as well as an excellent plate containing seventeen figures, will give great assistance to the student of the American species. Pp. 55—245 are wholly occupied by scientific descriptions of species, genera, and other larger groups. This portion of the work is divided into two parts, the first treating of the Acrididæ of the United States (pp. 55—190); the second (pp. 195—245) of those of North America, not found in the United States. The number of genera characterised as North American is 45; that of species 227. In the United States (exclusive of *Tettiginæ*, which contain 3 genera and 12 species) are, at present known, 125 species of 25 genera; of the former, *forty*, and of the latter, *four* are described as new; and six others also are described as not hitherto known to be represented in that more restricted locality. At pp. 3—6 will be found a boon to the American orthopterologist in the shape of a list of those authorities which contain descriptions of the genera and species of Acrididæ belonging to the North American fauna. Another exceedingly useful feature of Dr. Thomas's work is a glossary at the end explaining the technical terms (to the number of upwards of 200) used in the scientific descriptions; the utility of this glossary will, no doubt, be felt far beyond the circle of students and collectors of the Acrididæ.

OUR BOOK SHELF

Daily Bulletin of Weather Reports, Signal Service, United States Army, taken at 7.35 A.M., 4.35 P.M., and 11 P.M. Washington Mean Time, with the Synopses, Probabilities, and Facts for the Month of September 1872. (Washington, Government Printing Office, 1873.)

THIS is a quarto volume of upwards of 180 pp., containing besides 90 weather-charts—three for each day of the month of September 1872. The volume is published for